

Cell 3

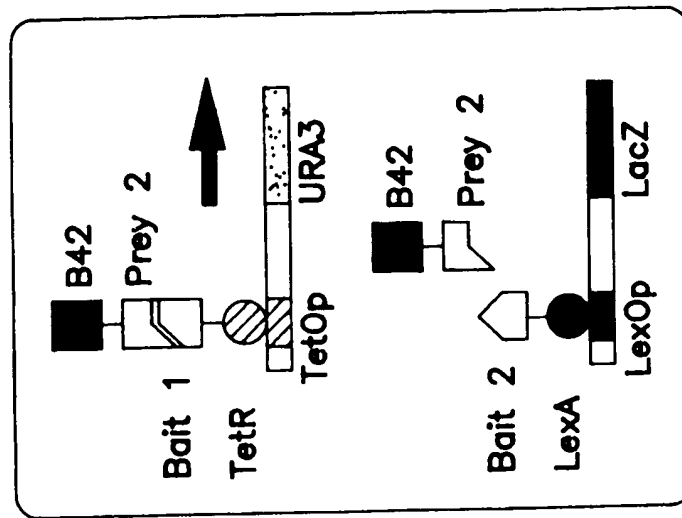


FIG. 1C

Cell 2

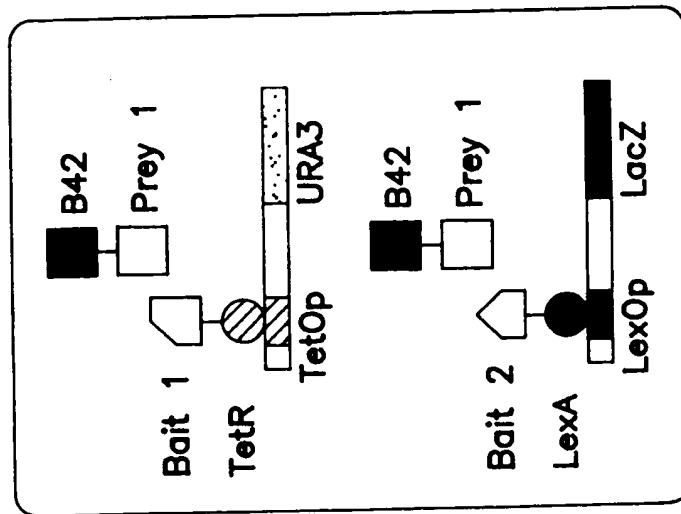


FIG. 1B

Cell 1

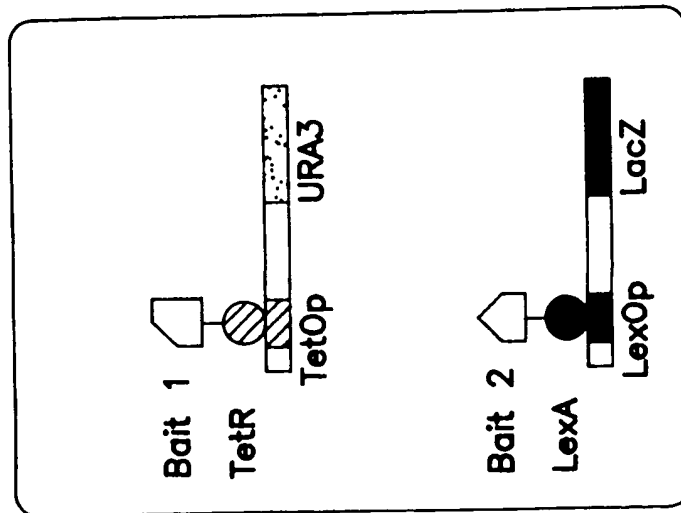


FIG. 1A

| Baits       | Prey                    | Reporter   | Reporter Output |              | Logical Relationship |
|-------------|-------------------------|------------|-----------------|--------------|----------------------|
|             |                         |            | X-Gal<br>Glu    | X-Gal<br>Gal |                      |
|             |                         |            | URA-<br>Glu     | URA-<br>Gal  |                      |
| LexA-hSos1  | B42-Ros<br>B42          | LexOp-LacZ |                 |              | And                  |
| TetR-c-Raf1 | B42-Ros<br>B42          | TetOp-URA3 |                 |              |                      |
| LexA-Max    | B42-c-Raf1<br>B42-Mxi1  | LexOp-LacZ |                 |              | Ls1                  |
| TetR-RosV12 | B42-c-Raf1<br>B42Mxi1   | TetOp-URA3 |                 |              | Ls2                  |
| LexA-RosV12 | B42-c-Raf1<br>B42-Cdc25 | LexOp-LacZ |                 |              | Ls1                  |
| TetR-RosA15 | B42-c-Raf1<br>B42-Cdc25 | TetOp-URA3 |                 |              | Ls2                  |

FIG. 2

425 4



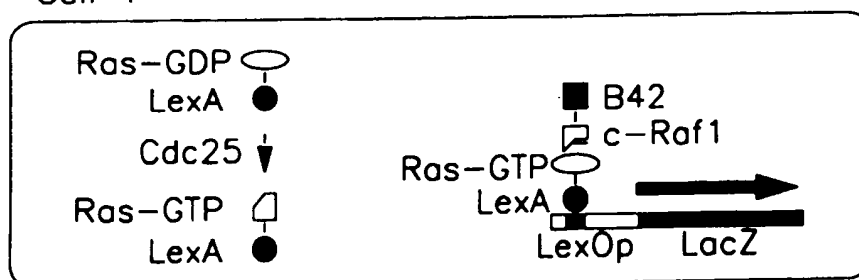
| Cell | LacZ Output   | $\beta$ -Galactosidase Activity |
|------|---|---------------------------------|
| 1    |  | $22.6 \pm 3.3$                  |
| 2    |  | $7.4 \pm 1.0$                   |

FIG. 3A

Cell 1



Cell 2

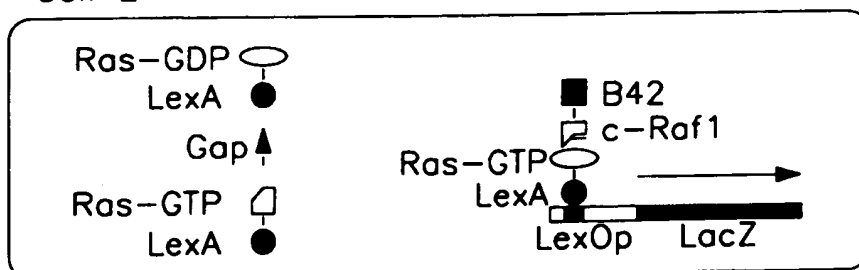


FIG. 3B

| Input Values  |          | LacZ Output |
|---------------|----------|-------------|
| 1(B42-c-Raf1) | 0(GAP)   | 0           |
| 1(B42-c-Raf1) | 1(Cdc25) | 1           |

FIG. 3C

# Logical Not

$\alpha$  factor = 0  
 TGF- $\beta$  = 1  
 Input  $\alpha$ -factor, output TGF- $\beta$   
 Input TGF- $\beta$ , output  $\alpha$  factor

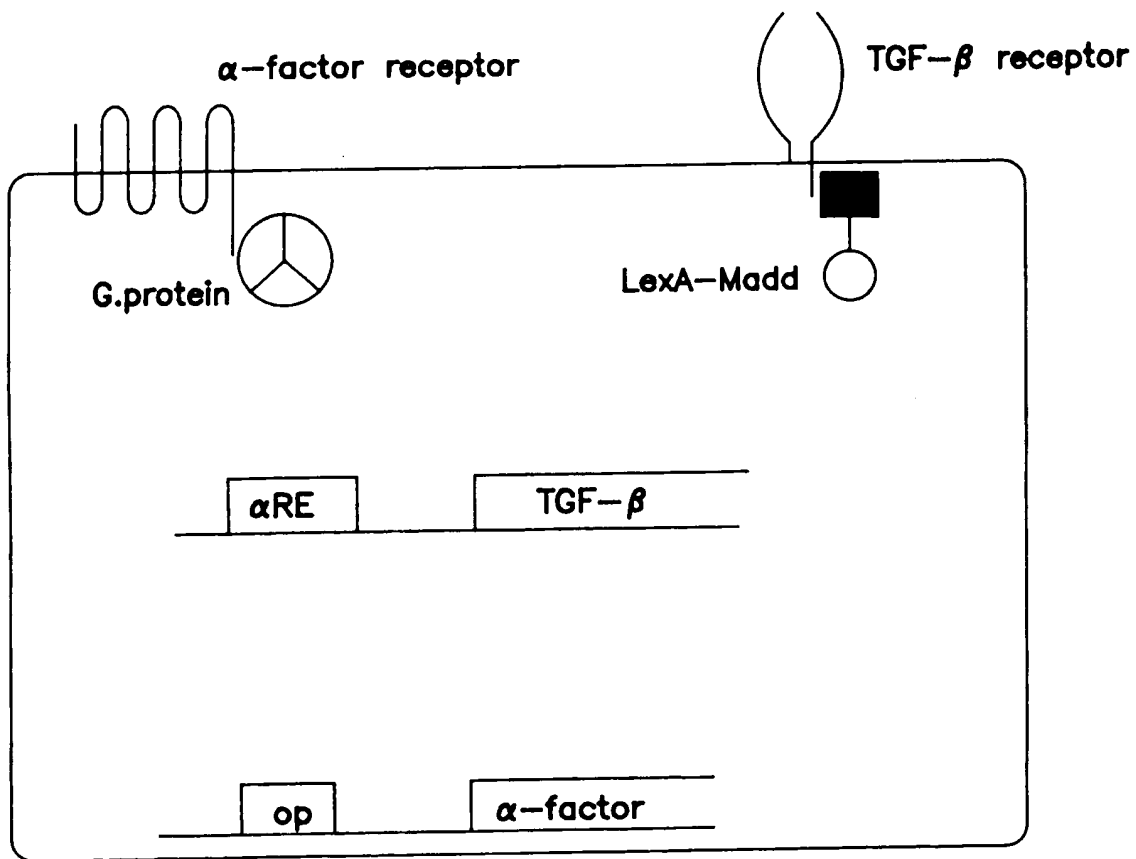


FIG. 4

Four input output channels  
(variety of possible logical operations)

| Inputs          | Receptors         |
|-----------------|-------------------|
| $\alpha$ factor | $\alpha$ factor R |
| TGF- $\beta$    | TGF- $\beta$ R    |
| Delta           | Notch             |
| Bradykinin      | Bradykinin R      |

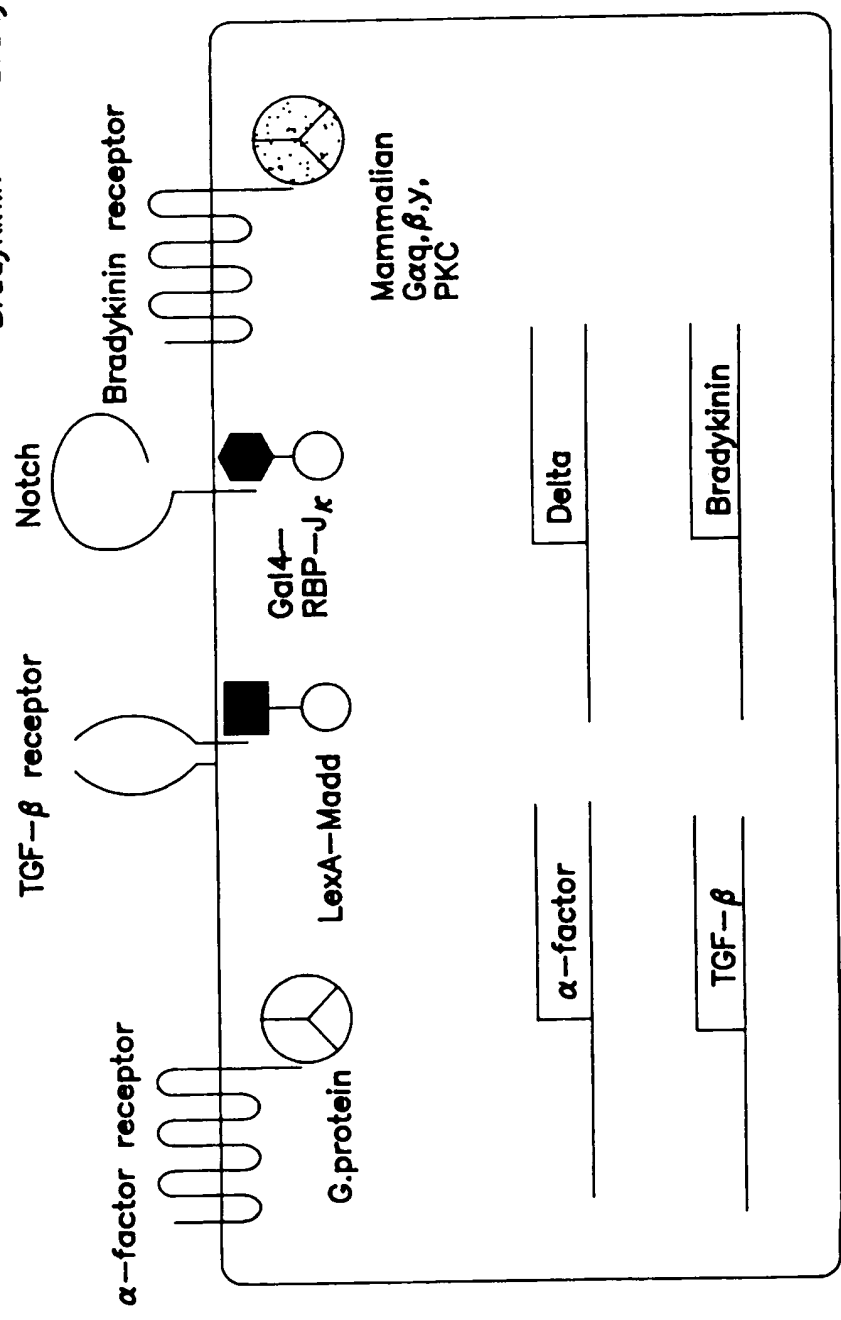


FIG. 5

# Fluorescence resonance energy transfer "transistor"

No green light input  
HIV protease linker intact  
Blue light input  
Green light output

Green light input  
Linker cleaved  
Blue light input  
No green fluorescence

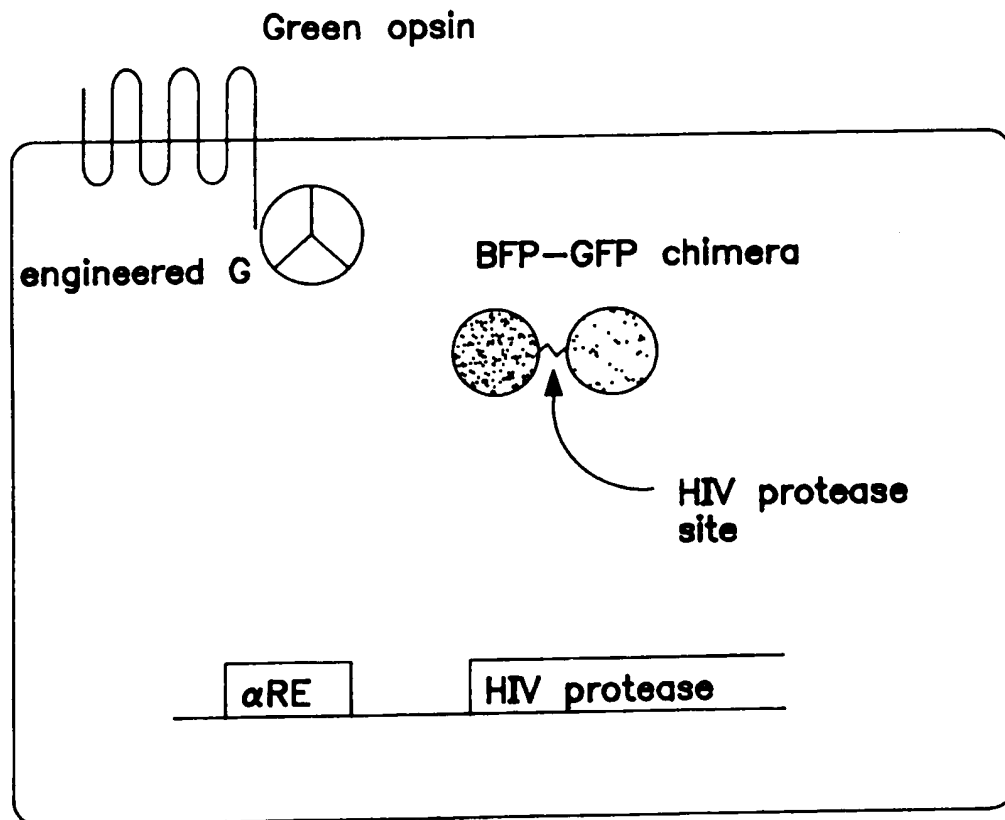


FIG. 6